

DESCRIPTION

TITLE OF INVENTION: ORAL COMPOSITION AND METHOD FOR
SUPPRESSING BITTERNESS DERIVED FROM ERGOTHIONEINE

5

TECHNICAL FIELD

[0001]

The present invention relates to an oral composition
containing ergothioneine or a salt thereof and theanine.

10 The present invention also relates to a method of reducing
bitterness derived from ergothioneine.

BACKGROUND ART

[0002]

15 Ergothioneine is one of hydrophilic sulfur-containing
amino acids and is known to have various physiological
activities including an antioxidant ability. Regarding the
physiological activities of ergothioneine, for example,
Patent Literature 1 reports actions such as one that
20 promotes the immune response activating cytokine
production.

Ergothioneine, which has various physiological
activities, has been drawing attention recently for its use
for foods, cosmetics, and pharmaceutical products.

25 [0003]

Regarding a composition containing ergothioneine, for
example, Patent Literature 2 discloses a method of reducing
changes in smell and/or discoloration of a composition
containing ergothioneine and/or a derivative thereof, the
30 method including adjusting the pH of the composition,
and/or adding a storage stabilizer to the composition.

CITATION LIST

- Patent Literature

35 [0004]

Patent Literature 1: JP 2017-218431 A

Patent Literature 2: JP 2012-241013 A

SUMMARY OF INVENTION

5 - Technical Problem

[0005]

As described above, since ergothioneine has useful physiological activities, foods such as supplements containing ergothioneine or a salt thereof are useful for maintaining or promoting health. However, ergothioneine or a salt thereof has a unique aroma and flavor, particularly bitterness (bitter taste) that stings the tongue, so that there is room for improvement in providing an oral composition containing ergothioneine or a salt thereof.

15 [0006]

The present invention aims to provide an oral composition containing ergothioneine or a salt thereof in which the bitterness derived from ergothioneine or a salt thereof is reduced. The present invention also aims to provide a method of reducing bitterness of an oral composition containing ergothioneine or a salt thereof, the bitterness being derived from ergothioneine or a salt thereof.

25 - Solution to Problem

[0007]

As a result of extensive studies to solve the above problem, the present inventors found that a combination of ergothioneine or a salt thereof and theanine can effectively reduce the bitterness derived from ergothioneine or a salt thereof.

[0008]

The present invention encompasses the following composition and the like.

35 (1) An oral composition containing:

a component (A); and a component (B), the component (A) being ergothioneine or a salt thereof, the component (B) being theanine.

5 (2) The composition according to (1) above, wherein the weight ratio (B)/(A) of the component (B) in terms of L-glutamic acid- γ -ethylamide to the component (A) in terms of ergothioneine is 2 to 90.

(3) The composition according to (1) or (2) above, wherein the composition is a food or beverage.

10 (4) A method of reducing bitterness of an oral composition containing (A) ergothioneine or a salt thereof, the bitterness being derived from (A) ergothioneine or a salt thereof, the method including a step of adding (B) theanine.

15 (5) The method according to (4) above, wherein the component (B) is added such that a weight ratio (B)/(A) of the component (B) in terms of L-glutamic acid- γ -ethylamide to the component (A) in terms of ergothioneine in the oral composition is 2 to 90.

20 (6) Use of (B) theanine for reducing bitterness derived from (A) ergothioneine or a salt thereof.

- Advantageous Effects of Invention [0009]

25 The present invention can provide an oral composition containing ergothioneine or a salt thereof in which the bitterness derived from ergothioneine or a salt thereof is reduced. The present invention can provide a method of reducing bitterness of an oral composition containing
30 ergothioneine or a salt thereof, the bitterness being derived from ergothioneine or a salt thereof.

DESCRIPTION OF EMBODIMENTS

[0010]

35 The composition of the present invention is an oral

composition containing (A) ergothioneine or a salt thereof and (B) theanine.

[0011]

Ergothioneine is one of the sulfur-containing amino acids. In the present invention, ergothioneine is preferably L-ergothioneine.

The salt of ergothioneine is not limited as long as it is a pharmacologically acceptable salt or a dietary acceptable salt, and it may be either an acid salt or a basic salt. Examples of the acid salt include inorganic acid salts such as hydrochloride, sulfate, nitrate, and phosphate; and organic acid salts such as acetate, citrate, maleate, malate, oxalate, lactate, succinate, fumarate, and propionate. Examples of the basic salt include alkali metal salts such as sodium salt and potassium salt; and alkaline earth metal salts such as calcium salt and magnesium salt.

[0012]

Ergothioneine or a salt thereof is not limited in any way by its form, production method, or the like. Ergothioneine or a salt thereof that can be used may be a chemically synthesized product or a purified extract from a natural product. L-ergothioneine is abundant in golden/yellow oyster mushrooms (scientific name: *Pleurotus cornucopiae* var. *citrinopileatus*) belonging to the genus *Pleurotus* of the family Pleurotaceae. L-ergothioneine is also present in mushrooms such as common mushrooms (scientific name: *Agaricus bisporus*) including white button mushrooms, cremini mushrooms, and portabella mushrooms; grey oyster mushrooms (scientific name: *Pleurotus ostreatus*), shiitake (scientific name: *Lentinula edodes*), hen-of-the-woods (scientific name: *Grifola Frondosa*), reishi mushrooms (scientific name: *Ganoderma lucidum*), lion's mane mushrooms (scientific name: *Hericium erinaceus*), Yanagi-matsutake (scientific name: *Agrocybe*

aegerita), girolles (scientific name: *Cantharellus cibarius*), porcini mushrooms (scientific name: *Boletus edulis*), and morel mushrooms (scientific name: *Morchella esculenta*). When L-ergothioneine is obtained from a natural product, preferably, it is extracted from a golden/yellow oyster mushroom, for example. Ergothioneine or a salt thereof can also be produced by microbial fermentation. Ergothioneine or a salt thereof may be in an isolated form.

For example, the ergothioneine or a salt thereof may be one derived from a golden/yellow oyster mushroom. The composition of the present invention may or may not contain a dried golden/yellow oyster mushroom.

[0013]

Theanine is one of the amino acids and is a derivative of glutamic acid. It is also one of umami components of tea.

Theanine has a unique aroma and flavor (a lingering unpleasant aftertaste due to excessive umami with slight sweetness). The composition of the present invention reduces the bitterness derived from ergothioneine or a salt thereof, owing to the presence of theanine. This facilitates continuous intake of ergothioneine or a salt thereof.

A combination of theanine and ergothioneine or a salt thereof can also reduce the aroma and flavor from theanine.

[0014]

Specific examples of theanine include L-glutamic acid- γ -ethylamide (L-theanine), L-glutamic acid- γ -methylamide, D-glutamic acid- γ -ethylamide (D-theanine), and D-glutamic acid- γ -methylamide. These types of theanine can be used alone or in combination of two or more.

An embodiment in which theanine is at least one selected from the group consisting of L-glutamic acid- γ -ethylamide (L-theanine), L-glutamic acid- γ -methylamide, D-

glutamic acid- γ -ethylamide (D-theanine), and D-glutamic acid- γ -methylamide is one of preferred embodiments of the present invention.

Theanine is more preferably L-theanine or D-theanine,
5 still more preferably L-theanine.
[0015]

Theanine for use in the present invention is not limited in any way by its form, production method, or the like. A chemically synthesized product may be used, or a
10 purified extract from a natural product may be used. Specifically, theanine may be produced by a method such as a separation and purification method from tea leaves, a tissue culture method using tea cells, or a method using an enzyme reaction.

15 One method using an enzyme reaction is a method in which a mixture of glutamine and ethylamine is reacted with glutaminase to obtain theanine. Theanine produced by such a method is also commercially available.

Theanine obtained by enzyme reaction is suitably used
20 as theanine (L-form) in the present invention.

Such theanine may be, for example, one derived from green tea leaves. The composition of the present invention may or may not contain green tea leaves.
[0016]

25 In the composition of the present invention, the weight ratio ((B) in terms of L-glutamic acid- γ -ethylamide/(A) in terms of ergothioneine) of the component (B) (in terms of L-glutamic acid- γ -ethylamide) to the component (A) (in terms of ergothioneine) is not limited
30 and may be 1 to 100. When the weight ratio of the component (B) (in terms of L-glutamic acid- γ -ethylamide) to the component (A) (in terms of ergothioneine) is in the above range, the bitterness derived from the component (A) can be sufficiently reduced.

35 The weight ratio is preferably 2 to 90, so that the

aroma and flavor derived from the component (B) can also be sufficiently reduced, making the composition more suitable for ingestion. The weight ratio is more preferably 3 to 80, still more preferably 5 to 70, particularly preferably 8 to 60, most preferably 10 to 50.

Herein, regarding the expression for the amount in terms of ergothioneine or an expression similar thereto, in the case of ergothioneine, the expression refers to the amount of ergothioneine; whereas in the case of a salt of ergothioneine, the expression refers to a value obtained by multiplying the molar number of the salt by the molecular weight of ergothioneine.

[0017]

The amount of ergothioneine or a salt thereof in the composition of the present invention is not limited and can be set according to the form of the composition or the like.

The amount of ergothioneine or a salt thereof in terms of ergothioneine in the composition of the present invention is, for example, preferably 0.1 wt% or more, more preferably 0.5 wt% or more, still more preferably 0.6 wt% or more, yet still more preferably 0.8 wt% or more, particularly preferably 1 wt% or more and is also preferably 50 wt% or less, more preferably 40 wt% or less, still more preferably 30 wt% or less, yet still more preferably 20 wt% or less, particularly preferably 10 wt% or less. In one embodiment, the amount of ergothioneine or a salt thereof in terms of ergothioneine in the composition of the present invention is preferably 0.1 to 50 wt%, more preferably 0.5 to 40 wt%, still more preferably 0.6 to 30 wt%, yet still more preferably 0.8 to 20 wt%, particularly preferably 1 to 10 wt%. The amount of ergothioneine can be measured by high-performance liquid chromatography (HPLC).

[0018]

The amount of theanine in the composition of the

present invention is not limited and can be set according to the form of the composition or the like. The total amount of theanine in the composition of the present invention is, for example, preferably 1 wt% or more, more
5 preferably 1.5 wt% or more, still more preferably 2 wt% or more, yet still more preferably 2.5 wt% or more, further still more preferably 5 wt% or more, particularly preferably 10 wt% or more, further particularly preferably 20 wt% or more and is also preferably 90 wt% or less, more
10 preferably 85 wt% or less, still more preferably 80 wt% or less, yet still more preferably 75 wt% or less, further still more preferably 70 wt% or less, particularly preferably 60 wt% or less, further particularly preferably 50 wt% or less. In one embodiment, the total amount of
15 theanine in terms of L-glutamic acid- γ -ethylamide in the composition of the present invention is preferably 1 to 90 wt%, more preferably 1.5 to 85 wt%, still more preferably 2 to 80 wt%, yet still more preferably 2.5 to 75 wt%, further still more preferably 5 to 70 wt%, particularly
20 preferably 10 to 60 wt%, further particularly preferably 20 to 50 wt%. When the composition contains two or more types of theanine, the total amount is the sum of these. The amount of theanine can be measured by HPLC.

[0019]

25 The amount of ergothioneine or a salt thereof in terms of ergothioneine in the composition of the present invention per adult daily intake is preferably 1 to 100 mg, more preferably 2 to 50 mg, still more preferably 5 to 25 mg, particularly preferably 5 to 20 mg.

30 The amount of theanine in terms of L-glutamic acid- γ -ethylamide in the composition of the present invention per adult daily intake is preferably 10 to 2000 mg, more preferably 20 to 1000 mg, still more preferably 50 to 500 mg.

35 [0020]

Ergothioneine or a salt thereof and theanine are compounds that are present in natural products and food and beverages and that have been consumed. Thus, for example, daily ingestion of ergothioneine or a salt thereof and theanine is less likely to cause problems in terms of safety. The present invention can provide a highly safe composition that is easy to ingest because the bitterness derived from ergothioneine or a salt thereof is reduced.

[0021]

As described above, ergothioneine or a salt thereof is known to provide various physiological activities and health functions. Known examples include antioxidant action, brain function improving effect, anti-aging action, eye disease alleviating effect, whitening effect, UV absorbing effect, melanin production suppressing effect, active oxygen species scavenging effect, elastase activity inhibitory effect, wrinkle formation suppressing effect, anti-skin sagging effect, and autophagy promoting effect.

Thus, the composition of the present invention can be suitably used for antioxidation, brain function improvement, anti-aging, eye disease, whitening, UV absorption, melanin production suppression, active oxygen species scavenging, elastase activity inhibition, wrinkle formation suppression, anti-skin sagging, and autophagy promotion.

[0022]

Theanine is known to provide various health functions such as relaxing effect, stress suppressing effect, sleep promoting effect, brain nerve cell protecting effect, effect to improve memory and concentration, effect to prevent high blood pressure, effect to alleviate sensitivity to cold, and effect to alleviate symptoms of premenstrual syndrome and menopause. Since the composition of the present invention contains theanine, the composition can also be used to obtain the above effects provided by

theanine.

[0023]

The composition of the present invention is applicable for therapeutic use (medical use) and non-
5 therapeutic use (non-medical use). The "non-therapeutic" is a concept that does not include medical activities, i.e., a concept that does not include methods of surgery, therapy, or diagnosis of humans.

The composition of the present invention can be
10 provided in the form of a food or beverage, a pharmaceutical product, a quasi-pharmaceutical product, feed, or the like. The composition of the present invention may be a material, preparation, or the like to be added to a food or beverage, a pharmaceutical product, a
15 quasi-pharmaceutical product, feed, or the like.

[0024]

The composition of the present invention is an oral composition. Specifically, the oral composition may be a food or beverage, an oral pharmaceutical product, an oral
20 quasi-pharmaceutical product, feed, or the like. A food or beverage or an oral pharmaceutical product is preferred, and a food or beverage is more preferred.

[0025]

The composition of the present invention can contain
25 optional additives and optional components in addition to ergothioneine or a salt thereof and theanine, as long as the effect of the present invention is not impaired. Such additives and components may be selected depending on the form of the composition, for example, and those generally
30 usable in oral compositions such as food or beverages, pharmaceutical products, quasi-pharmaceutical products, and feed can be used. When the composition of the present invention is provided as a food or beverage, a pharmaceutical product, a quasi-pharmaceutical product,
35 feed, or the like, any general method can be used for

production. In one embodiment, the composition of the present invention may consist of ergothioneine or a salt thereof and theanine.

The oral composition of the present invention may be
5 in any form such as a solid (e.g., powder, granule, or tablet), liquid, or paste.

[0026]

For example, when the composition of the present invention is provided as a food or beverage, components
10 usable in food or beverages (e.g., food materials and optional food additives) can be added to ergothioneine or a salt thereof and theanine to provide various food or beverages. The food or beverage is not limited. Examples thereof include general food or beverages, health foods,
15 health supplements, health drinks, foods with function claims, foods for specified health uses, and foods for the sick. The health foods, health supplements, foods with function claims, foods for specified health uses, and the like can be used in various forms of preparations such as
20 fine granules, tablets, granules, powders, capsules, chewable tablets, dry syrups, syrups, liquid agents, beverages, energy drinks, and liquid foods.

[0027]

When the composition of the present invention is
25 provided as a pharmaceutical product or a quasi-pharmaceutical product, for example, a pharmacologically acceptable carrier, an optional additive, or the like can be added to ergothioneine or a salt thereof and theanine to provide various dosage forms of pharmaceutical products or
30 quasi-pharmaceutical products. Such a carrier, additive, or the like may be any pharmacologically acceptable one that can be used in pharmaceutical products or quasi-pharmaceutical products. Examples thereof include excipients, binders, disintegrants, lubricants,
35 antioxidants, and colorants. One or more of these can be

used. Examples of the dosage form for oral administration of pharmaceutical products or quasi-pharmaceutical products include liquids, tablets, powders, fine granules, granules, sugar-coated tablets, capsules, suspensions, emulsions, and

5 chewable tablets.

[0028]

When the composition of the present invention is provided as feed, ergothioneine or a salt thereof and theanine are simply added to feed. The feed includes feed

10 additives. Examples of the feed include livestock feed for animals such as cows, pigs, chickens, sheep, and horses; feed for small animals such as rabbits, rats, and mice; and pet food for animals such as dogs, cats, and birds.

[0029]

15 The composition of the present invention may be ingested by or administered to any subject (administration subject). The administration subject is preferably a human or non-human mammal, more preferably a human.

[0030]

20 The present invention also encompasses the following method:

A method of reducing bitterness of an oral composition containing (A) ergothioneine or a salt thereof, the bitterness being derived from (A) ergothioneine, the

25 method including a step of adding (B) theanine.

In preparing an oral composition, the weight ratio ((B)/(A)) of the component (B) to the component (A) (in terms of ergothioneine) is adjusted to the above range, whereby an oral composition can be obtained in which the

30 bitterness derived from ergothioneine or a salt thereof and the aroma and flavor derived from theanine are reduced. The weight ratio can be adjusted by, for example, adding the component (A) and/or the component (B).

[0031]

35 The present invention also encompasses the following

use:

Use of (B) theanine for reducing bitterness derived from (A) ergothioneine or a salt thereof.

[0032]

5 The above method and use make it possible to effectively reduce the bitterness derived from ergothioneine.

10 In the above method and use, ergothioneine or a salt thereof and theanine as well as preferred embodiments thereof are as described above for the composition of the present invention.

15 In the above method and use, the mixing ratio and percentage of used amount of the component (B) (in terms of L-glutamic acid- γ -ethylamide) to the component (A) (in terms of ergothioneine) are not limited. Preferred ranges are the same as those of the weight ratio of the component (B) (in terms of L-glutamic acid- γ -ethylamide) to the component (A) (in terms of ergothioneine) in the composition of the present invention.

20 [0033]

The above method and use can reduce the bitterness derived from ergothioneine or a salt thereof. The above method and use may also be combined with a different bitterness reducing method.

25 Examples of the different bitterness reducing methods include a formulation method including adding a sweetener or flavoring agent to a component having bitterness, a formulation method including sugar-coating a component having bitterness, and a formulation method including encapsulating a component having bitterness.

30 [0034]

35 The numerical range defined by the lower limit and the upper limit herein, i.e., "the lower limit to the upper limit", includes the lower limit and the upper limit. For example, the range defined by "1 to 2" means 1 or more and

2 or less, with 1 and 2 being inclusive. Herein, the range may be any combination of any upper limit and any lower limit.

5 EXAMPLES

[0035]

The present invention is described in further detail below with reference to Examples. The present invention is not limited to these Examples.

10 [0036]

The following materials are used in an evaluation test described below.

(A) Ergothioneine: raw material containing 100% L-
ergothioneine

15 (B) Theanine: raw material containing 100% L-theanine

[0037]

<Example 1: Aroma and flavor evaluation test on composition containing ergothioneine and theanine>

Compositions containing ergothioneine and theanine
20 were prepared and subjected to sensory evaluation by three
panelists expertized in sensory evaluation.

The components (A) and (B) in the amounts shown in Table 1 were mixed to prepare compositions (compositions containing ergothioneine and theanine) of samples 1 to 5. Table 1 shows the weight ratio (B)/(A) in the compositions of the samples 1 to 5. The three panelists placed the whole amount of the composition prepared (for example, in the case of the sample 1, 10 mg ergothioneine and 10 mg theanine, i.e., 20 mg in total) directly on the tongue. The intensity of the bitterness derived from ergothioneine, and the intensity of the lingering aftertaste derived from theanine were evaluated based on the following criteria.

[0038]

(A) Criteria for bitterness derived from ergothioneine

35 Five points were given to the intensity of the

bitterness of the (A) ergothioneine alone (10 mg) (control 1). One point was given to the case where no bitterness derived from ergothioneine was felt. The intensity was evaluated with one to five points (five-point scale).

5 Evaluation results by the three panelists were collected. Table 1 shows the average results (points).
5 points: The bitterness derived from ergothioneine is strongly felt.

4 points: The bitterness derived from ergothioneine is
10 felt.

3 points: The bitterness derived from ergothioneine is slightly felt.

2 points: The bitterness derived from ergothioneine is not much felt.

15 1 point: The bitterness derived from ergothioneine is not felt.

[0039]

(B) Criteria for lingering aftertaste derived from theanine

Five points were given to the lingering aftertaste of
20 (B) theanine alone (10 mg) (control 2). One point was given to the case where no lingering aftertaste derived from theanine was felt. The lingering aftertaste was evaluated with one to five points (five-point scale).

25 Evaluation results by the three panelists were collected. Table 1 shows the average results (points).

5 points: The lingering aftertaste derived from theanine is strongly felt.

4 points: The lingering aftertaste derived from theanine is felt.

30 3 points: The lingering aftertaste derived from theanine is slightly felt.

2 points: The lingering aftertaste derived from theanine is not much felt.

35 1 point: The lingering aftertaste derived from theanine is not felt.

[0040]

[Table 1]

	Amount added (mg)		Ratio (B)/(A)	Evaluation results (points)	
	(A) Ergothioneine	(B) Theanine		Bitterness derived from (A)	Lingering aftertaste derived from (B)
Control 1	10	0	0	5.0	—
Sample 1	10	10	1	4.0	1.0
Sample 2	10	100	10	2.7	2.3
Sample 3	10	500	50	1.7	3.3
Sample 4	10	1000	100	1.0	4.3
Sample 5	20	200	10	2.3	2.7
Control 2	0	10	—	—	5.0

[0041]

5 <Results>

The results confirm that a combination of ergothioneine and theanine reduces the bitterness derived from ergothioneine.

When theanine is ingested alone, it has a strong
 10 lingering aftertaste and is thus not suitable for
 ingestion. However, the results confirm that a combination
 of theanine with ergothioneine reduces the degree of
 lingering aftertaste.

CLAIMS

Claim 1. An oral composition comprising:
a component (A); and
5 a component (B),
the component (A) being ergothioneine or a salt
thereof, the component (B) being theanine.

Claim 2. The composition according to claim 1,
10 wherein a weight ratio (B)/(A) of the component (B)
in terms of L-glutamic acid- γ -ethylamide to the component
(A) in terms of ergothioneine is 2 to 90.

Claim 3. The composition according to claim 1 or 2,
15 wherein the composition is a food or beverage.

Claim 4. A method of reducing bitterness of an oral
composition containing (A) ergothioneine or a salt thereof,
the bitterness being derived from (A) ergothioneine or a
20 salt thereof, the method comprising:
a step of adding (B) theanine.

Claim 5. The method according to claim 4,
wherein the component (B) is added such that a weight
25 ratio (B)/(A) of the component (B) in terms of L-glutamic
acid- γ -ethylamide to the component (A) in terms of
ergothioneine in the oral composition is 2 to 90.

Claim 6. Use of (B) theanine for reducing bitterness
30 derived from (A) ergothioneine or a salt thereof.